

3.0 VALIDATION RESULTS — FUNCTION LEVEL

This section contains a summary of validation findings derived from assessments of functional performance in the *RADGUNS* model. Table 3.0-1 lists the FEs that have been assessed during recent validation efforts, along with summary results and implications for model use.

TABLE 3.0-1. Validation Results — Function Level.

FAT Key	FAT Functional Element	Model Version	Results	Implications for Model Use
4.1	Thermal Noise	1.9	Value used in model derived from nominal intel values for noise figure and bandwidth.	No restrictions or limitations.
5.1	Antenna Gain	2.0	Table used in model taken directly from intel source.	No restrictions or limitations.
7.1	Angle Track	1.9	Differences in percentage overshoot, rise, peak, and settling times within 33%.	Slightly faster rise, settling, and peak times and less overshoot may cause slightly smaller angle errors.
7.2	Range Track	1.9	Differences in percentage overshoot, rise, peak, and settling times within 7%.	No restrictions or limitations.
8.2	Gun Movement	1.9	Differences in percentage overshoot, rise, peak, and settling times within 12% for 1.5-deg step.	No restrictions or limitations.
9.2	Ballistics	2.0	<ul style="list-style-type: none"> 23 mm - altitude and downrange values within 6 m after 10 s TOF. 57 mm - altitude and downrange values within 35 m after 10 s TOF. 	No restrictions or limitations.

3.0.1 Implications for Model Use

Validation efforts were limited by the availability of data suitable for use in comparisons with model outputs. As a result of v.1.8 validation findings, the Thermal Noise, Angle Track, and Range Track FEs were changed in v.1.9. The thermal noise value was updated to match current intelligence data, and the tracking servos were adjusted to produce transient response plots more characteristic of those shown in the reference. Validation of the 57-mm ballistics function in v.1.9 revealed a problem in the drag function implementation. This anomaly significantly impacted computed miss distances, resulting in unreasonably low P_h/P_k values. The anomaly was corrected in v.2.0.

